

Contents

Preface	ix
Referee Committee	xi
Structural, electronic and magnetic properties of liquid, amorphous and quasicrystalline metals	1
J. Hafner (Wien, Austria)	
Structure of liquid metals determined by scattering techniques	9
J. Teixeira (Gif-sur-Yvette, France)	
The temperature dependence of the crystal-melt interfacial tension: a simple model	15
F. Spaepen (Cambridge, MA, USA)	
Structure of diatomic clusters	19
M. Ronchetti and S. Cozzini (Povo, Italy)	
Slow dynamics in supercooled liquids: molecular dynamics simulations	23
F. Yonezawa and S. Fujiwara (Yokohama, Japan)	
Evidence of fractals in the preliminary stages of amorphization by mechanical alloying	29
G. Cocco (Sassari, Italy), N. Cowlam (Sheffield, UK) and S. Enzo (Venice, Italy)	
Thermodynamic properties of liquid metals	35
R. I. L. Guthrie (Montreal, Que., Canada) and T. Iida (Osaka, Japan)	
Thermodynamics of undercooled melts and metastable phase formation	43
L. Battezzati (Torino, Italy)	
Thermodynamic properties of undercooled liquid metals: experiments and models	51
F. Sommer (Stuttgart, Germany)	
Thermodynamics of undercooled liquids and its application to amorphous phase formation	55
R. Bormann (Geesthacht, Germany)	
Development of containerless modulation calorimetry for specific heat measurements of undercooled melts	61
H. J. Fecht and R. K. Wunderlich (Berlin, Germany)	
Chemical interdiffusion in amorphous early-late transition metal alloys	65
J. Böttiger (Aarhus, Denmark), A. L. Greer (Cambridge, UK) and N. Karpe (Stockholm, Sweden)	
Containerless processing of undercooled melts: measurements of surface tension and viscosity	73
I. Egry and S. Sauerland (Cologne, Germany)	
Measurements of thermophysical properties in high temperature melts	77
K. C. Mills and R. F. Brooks (Teddington, UK)	
Determination of thermophysical properties of liquid metals at high temperatures by levitation methods	83
J. L. Margrave (Houston, TX, USA)	
Thermodynamic properties of quasi-crystal-forming AlMn alloys from Knudsen cell mass spectrometric measurements	89
C. Bergman (Marseille, France), M. Saito (Sendai, Japan) and R. Chastel (Marseille, France)	
Combined time-of-flight and mass spectroscopy for determination of the temperature of undercooled melts	93
J. Laakman, U. Trociewitz and G. J. Schmitz (Aachen, Germany)	
Liquid metal surface tension measurements: a kinetic-fluodynamic model of surface oxygen availability	99
E. Ricci, P. Castello, A. Passerone and P. Costa (Genova, Italy)	

CONTENTS (*continued*)

Nucleation reactions in undercooled liquids	105
J. H. Perepezko (Madison, WI, USA)	
Nucleation and solidification studies using drop-tubes	113
A. L. Greer (Cambridge, UK)	
Nucleation theory for diffuse interfaces	121
L. Gránásy (Köln, Germany)	
Analysis of the different nucleation behaviour of tantalum samples processed in the Grenoble high drop tube	125
B. Vinet and L. Cortella (Grenoble, France)	
Microstructure characteristics of rapidly solidified alloys	129
R. Trivedi (Ames, IA, USA)	
Dendritic solidification of undercooled melts: mushy zone recalescence dynamics	137
M. E. Glicksman, L. M. Mizenko (Troy, NY, USA), M. E. Rettenmayer (Darmstadt, Germany) and S. P. Marsh (Washington, DC, USA)	
Theory of dendritic growth in three dimensions	147
M. Ben Amar and E. Brener (Paris, France)	
On the formation of the banded structure in rapid solidification	153
A. Sarkissian and A. Karma (Boston, MA, USA)	
Measurements of dendrite growth velocities in undercooled pure Ni-melts—some new results	159
K. Eckler and D. M. Herlach (Köln, Germany)	
Nucleation and metastable phase formation in undercooled Fe-Cr-Ni melts	163
W. Löser (Dresden, Germany), T. Volkmann and D. M. Herlach (Köln, Germany)	
Non-equilibrium interface kinetics during rapid solidification	167
M. J. Aziz (Cambridge, MA, USA)	
Selection of microstructures in rapid solidification processing	171
W. Kurz and P. Gilgien (Lausanne, Switzerland)	
Pulsed laser quenching of metastable phases	179
P. Baeri (Catania, Italy)	
Rapid surface melting	185
E. Ramous (Padova, Italy)	
Metastable phase solidification in electron beam welding of dissimilar stainless steels	189
S. Tsukamoto, H. Harada (Tokyo, Japan) and H. K. D. H. Bhadeshia (Cambridge, UK)	
Thermodynamic and kinetic study of the ultrafast solidification of Si-As supersaturated solid solutions	195
R. Reitano (Catania, Italy)	
Microstructure selection in binary and ternary alloys	199
P. Gilgien and W. Kurz (Lausanne, Switzerland)	
Rapid solidification in laser welding of stainless steels	203
A. Zambon and F. Bonollo (Padova, Italy)	
A statistical approach to understanding nucleation phenomena	209
C. W. Morton, W. H. Hofmeister, R. J. Bayuzick (Nashville, TN, USA) and B. Robinson (Alabama, AL, USA)	
Prediction of solute trapping at high solidification rates using a diffuse interface phase-field theory of alloy solidification	217
W. J. Boettinger, A. A. Wheeler, B. T. Murray and G. B. McFadden (Gaithersburg, MD, USA)	
Embedded droplet measurements and an adsorption model of the heterogeneous nucleation of solidification	225
B. Cantor (Oxford, UK)	
Eutectic and off-eutectic growth patterns	233
R. F. Xiao, J. I. D. Alexander and F. Rosenberger (Huntsville, AL, USA)	
Fine fibers by melt extraction	239
J. Ström-Olsen (Montreal, Que., Canada)	

CONTENTS (*continued*)

Mechanical instabilities in extended solid solutions near the crystal-to-glass transition	245
C. Ettl and K. Samwer (Augsburg, Germany)	
Stability and transformation to crystalline phases of amorphous Zr-Al-Cu alloys with significant supercooled liquid region	255
A. Inoue, D. Kawase, A. P. Tsai, T. Zhang and T. Masumoto (Sendai, Japan)	
Time-resolved X-ray diffraction studies of crystallization in metallic glasses	265
M. Sutton (Montreal, Que., Canada)	
Crystallization of highly undercooled metallic melts and metallic glasses around the glass transition temperature	271
U. Köster and J. Meinhardt (Dortmund, Germany)	
A search for static structure changes in disordered systems in connection with atomic mobility changes	279
P. A. Duine, L. Pusztai and J. Sietsma (Delft, Netherlands)	
Icosahedral order in glass-forming metallic melts	285
J. M. Dubois, F. Montoya and C. Back (Nancy, France)	
The undercooling and phase formation behaviour of melts of quasicrystal-forming alloys	293
K. Urban, D. Holland-Moritz (Jülich, Germany), D. M. Herlach (Köln, Germany) and B. Grushko (Jülich, Germany)	
Undercooling of superalloy melts: basis of a new manufacturing technique for single-crystal turbine blades	299
A. Ludwig, I. Wagner, J. Laakmann and P. R. Sahm (Aachen, Germany)	
Rapid solidification of undercooled nickel-aluminium melts	305
M. Barth, B. Wei, D. M. Herlach and B. Feuerbacher (Köln, Germany)	
Heterogeneously nucleated α -Al in amorphous aluminium alloys	309
P. Schumacher and A. L. Greer (Cambridge, UK)	
AUTHOR INDEX	315
SUBJECT INDEX	317

